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extending Arctic pack ice in the hope of finding a passage toward the eastern shore of Greenland through some break in this impassable barrier. Nearly seven degrees of southing were traversed before the *Belgica* could be headed to the westward and, amongst the broken floe ice between the pack ice and the Greenland coast, again struggle to the northward. Under these circumstances a latitude of about  $78^{\circ} 16'$  was attained, when the ship retraced her course, leaving the broken ice at a point nearly west of Jan Mayen and thence proceeding to the westward of Iceland, touching at Reykjavik, and so homeward.

Among the special objects of the cruise was the extension and confirmation of Nansen's observations and theories in regard to the conformation of the sea bottom, the currents off the east coast of Greenland, the distribution of marine animal life in the plankton and on the surface of the sea, and the inter-relations of Arctic and North Atlantic waters mingling in the Greenland Sea.

The scientific results are detailed in this truly magnificent volume, in which, of the printer's and cartographer's art, nothing has been spared in the endeavor to approach perfection.

Geographically the more interesting results were the latitude attained by the vessel, a considerable distance further than previous navigators on this dangerous coast; the discovery of a number of new islands off the coast of Greenland; and of a submarine moraine, about forty miles broad-off the Greenland coast and parallel with it, which received the name of Belgica Bank.

Space would not suffice to analyze in detail the work accomplished, but a summary of the contents will enable those interested to form a general idea of the results.

A summary, with synoptical charts of the meteorological conditions during the cruise, is given by Dan La Cour. O. B. Böggild contributes a memoir on the submarine sediments and their distribution, with notes on the submarine moraine before referred to and the continental rocks collected. Ostenfeld, C. Jensen, Ferdinandsen, Winge and Deichmann

Branth discuss the phanerogams, mosses, fungi and lichens obtained. Helland-Hansen and Koefoed discuss the hydrography in a division of 220 pages luxuriously illustrated by maps and sections, and more than 100 pages are given to a study of the plankton by Koefoed and others. C. Hartlaub contributes a memoir on the medusæ, and Koefoed one on the fishes with fine illustrations of numerous larval forms. J. Grieg describes the invertebrates collected, first on the coast of Spitsbergen and, secondly, from the Greenland Sea, with the assistance of several other naturalists who have determined the species of special groups. Some observations follow on the food of the walrus, bearded seal, *Tringa striata*, and the tom cod. The volume closes with tables of the dredging stations, an enumeration of the scientific staff of the expedition, and a full table of contents; but curiously enough, no index.

This splendid volume, with its wealth of carefully conducted observations, will form a permanent monument to the liberality and good sense of the noble patron of the expedition and a happy contrast to the barren exploits of unscientific pole seekers with which from time to time the daily press concerns itself.

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#### SPECIAL ARTICLES

##### PRELIMINARY NOTE ON THE CHROMOSOMES IN THE OOGENESIS, FERTILIZATION AND CLEAVAGE OF CERTAIN HEMIPTERA

IN the recent work on the spermatogenesis of the Hemiptera heteroptera it has been shown that in the members of some families of this group, notably the Coreidæ, the spermatogonia have an odd number of chromosomes, one of the latter being the unpaired idiochromosome or "accessory" chromosome. Owing to the fact that this chromosome passes undivided to one pole of the spindle in one of the maturation mitoses while the others divide equally in both, two classes of spermatozoa are formed in equal numbers, one class having the idiochromosome, the other lacking it. The oogonia have been shown to have an even number of chromosomes, there being two equal

in size in place of the unpaired element of the spermatogonia. It has been assumed that in the maturation of the eggs all the chromosomes divide in both divisions, giving to each matured egg a group of chromosomes similar in all respects to that borne by the class of spermatozoa having the idiochromosome. In short, while the dimorphism of the spermatozoa has been shown to be a fact, the similarity of the eggs has rested upon inference only. It has been assumed further that if an egg is fertilized by a spermatozoon bearing the idiochromosome an embryo will be produced whose nuclei all have an even number of chromosomes similar in all respects to the oogonial groups, but if fertilized by a spermatozoon lacking that chromosome, the resulting embryonic nuclei will all have an odd number of chromosomes similar to the spermatogonial groups. The former class of embryos accordingly will be females, the latter males.

It seemed advisable to the writer to examine the oogenesis, fertilization and cleavage of the coreid family and determine if possible whether there is a basis of fact for these assumptions. With this end in view, sections of the eggs of *Archimerus*, *Anasa*, *Chelinidea* and *Protenor* were made, some before laying, but chiefly at intervals after laying. Although some difficulties of technique were encountered, fairly good series were obtained. The results are as follows:

The number of oogonial chromosomes in *Archimerus* is 16, in *Anasa* 22, and in *Protenor* 14. In the first polar (oocyte) division, these numbers are reduced to 8, 11 and 7, respectively. The chromosomes exhibit the same number and size relations as in the first spermatocytes except that the idiochromosome is here a bivalent, having resulted in all probability from the synapsis of two oogonial chromosomes. In *Protenor* the idiochromosome-bivalent can be readily identified by its size. In *Archimerus* all the chromosomes divide in both polar (oocyte) divisions and it is probable that the same is true for *Anasa* and *Protenor*, though all stages of maturation were not obtained in these two forms. As a result of maturation all the eggs are of one kind with regard to their chromatin-content,

and further the female pronucleus contains a group of chromosomes similar in number and size relations to that of a spermatozoon bearing the idiochromosome. At fertilization the reduced groups in the male and female pronuclei are again distinguishable just before they enter the first cleavage spindle.

In the cleavage and early blastoderm nuclei of *Archimerus*, *Anasa*, *Chelinidea* and *Protenor*, the chromosomes can be readily counted, and show the same numbers and size relations as in the gonads, though, as a whole, somewhat more elongated. Two types of embryos are found, one having an odd, and the other an even number of chromosomes, these numbers being respectively the same as occur in the spermatogonia and oogonia. Accordingly, the former are males, the latter females. Thus in *Archimerus* the embryos have either 15 or 16 chromosomes, in *Anasa* and *Chelinidea* 21 or 22, in *Protenor* 13 or 14. In short the sex of an embryo may be determined by counting its chromosomes.

The results in general complete the history of the idiochromosome ("accessory" chromosome) and its mate, showing their behavior in the maturation of the egg and their presence, either singly or together, in the embryonic (somatic) nuclei. They also lend additional support to the theory of chromosome-individuality and to the recent theories of sex-production based upon cytological studies.

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#### SOCIETIES AND ACADEMIES

##### THE AMERICAN PHYSICAL SOCIETY

THE regular Thanksgiving meeting of the Physical Society was held in the new physical laboratory of the University of Illinois, Urbana, Ill., on Saturday, November 27, 1909. The meeting was well attended, practically all the universities of the middle west, as well as several in the east, being represented. President Henry Crew presided. The following papers were presented:

"Preparation and Properties of the Heusler Alloys," by A. A. Knowlton.

"Hysteresis Tests of Heusler Alloys," by A. A. Knowlton and O. G. Clifford.